JUNCTION-SIDE ILLUMINATED SILICON DETECTOR ARRAYS

ABSTRACT

A junction-side illuminated detector array of pixelated detectors is constructed in a silicon wafer. A junction contact on the front-side may cover the whole detector array, and may be used as an entrance window for light, x-ray, gamma ray and/or other particles. The back-side has an array of individual ohmic contact pixels. Each of the ohmic contact pixels on the back-side may be surrounded by a grid or a ring of junction separation implants. Effective pixel size may be changed by separately biasing different sections of the grid. A scintillator may be coupled directly to the entrance window while readout electronics may be coupled directly to the ohmic contact pixels. The detector array may be used as a radiation hardened detector for high-energy physics research or as avalanche imaging arrays.